PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.:	10/825,388
Filing Date:	April 15, 2004
Applicant:	Victor Blakemore Slaughter
Group Art Unit:	1795
Examiner:	Daborah Chacko-Davis
Title:	METHOD AND APPARATUS FOR MONITORING SATURATION LEVELS OF SOLVENTS USED DURING RAPID PROTOTYPING PROCESSES
Attorney Docket:	7784-000947/US

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF
UNDER 37 C.F.R. § 41.37

Sir:

The present appeal brief is being submitted in response to the Final Office Action mailed April 3, 2008.

APPELLANT'S BRIEF ON APPEAL

Pursuant to 37 C.F.R. § 41.37, this Brief on Appeal is submitted as follows:

REAL PARTY IN INTEREST – UNDER 37 C.F.R. § 41.37(c)(1)(i)

The real party in interest in this appeal is The Boeing Company, a corporation of the State of Delaware, having its principal place of business at 100 North Riverside Plaza, Chicago, Illinois 60606-1596, by virtue of an assignment recorded April 15, 2004, at Reel 015224/ Frame 0637.

RELATED APPEALS & INTERFERENCES - UNDER 37 C.F.R. § 41.37(c)(1)(ii)

To the best of Appellant's knowledge, no other appeals or interferences are pending which will directly affect, be directly affected by or have a bearing on the Board's decision in the present pending appeal.

STATUS OF THE CLAIMS – UNDER 37 C.F.R. § 41.37(c)(1)(iii)

Claims 1, 2, 4-11 and 13-17 are pending in the application, and all stand finally rejected. Claims 18-21 have been withdrawn. Concurrently with the filing of the present brief, a fee in accordance with 37 C.F.R. § 41.20(b)(2) is being submitted to cover the cost of submitting the present appeal brief. The Notice of Appeal fee required under 37 C.F.R. § 41.20(b)(1) was submitted on June 26, 2008 by the undersigned.

A copy of the claims presently being appealed is provided in the attached "Claims Appendix".

STATUS OF AMENDMENTS – UNDER 37 C.F.R. § 41.37(c)(1)(iv)

A Final Office Action was mailed April 3, 2008. The last paper filed by the Applicant's representative was a "Pre-Appeal Statement" that was filed on June 26, 2008, by the undersigned, which was entered by the Office. There are no other amendments or other papers filed by the undersigned in the present application that remain "unentered".

SUMMARY OF THE CLAIMED SUBJECT MATTER – UNDER 37 C.F.R. § 41.37(c)(1)(v)

Independent Claim 1

1. A method comprising:

forming at least a portion of an object by curing resin (p. 10, lines 2-5);

providing a storage device containing a liquid (liquid storage device 22; Figure 1; p. 7;lines 17-19), the liquid comprising solvent and dissolved resin (p. 8, lines 16-19), the liquid having a ratio of the dissolved resin to the solvent (p. 9, lines 21-22 through p. 10, lines 1-2);

removing an amount of resin from the object by submersing the object in the liquid in the storage device in a manner such that the amount of resin becomes dissolved in the liquid and thereby increases the ratio of the dissolved resin to the solvent of the liquid (p. 10, lines 7-13), the increase of the ratio altering an electrical characteristic of the liquid (p. 11, lines 15-21);

utilizing changes in the electrical characteristic of the liquid as an indicator of the ratio of the dissolved resin to the solvent of the liquid (p. 11, lines 15-22 and p. 12, lines 1-6); and

using said changes in the electrical characteristic of the liquid to drive a visual display (p. 12, lines 6-14) that is able to provide a plurality of different indications as to said ratio (p. 12-lines 20-22 through p. 13, lines 1-16).

Independent Claim 10

10. A method comprising:

forming at least a portion of an object by curing resin (p. 10, lines 2-5);

providing a storage device containing a liquid (liquid storage device 22; Figure 1; p. 7, lines 17-19), the liquid comprising solvent and dissolved resin (p. 8, lines 16-19), the liquid having at least one electrical characteristic (p. 11, lines 4-14);

removing an amount of resin from the object by submersing the object in the liquid in the storage device such that the amount of resin becomes dissolved in the liquid and thereby alters the electrical characteristic of the liquid (p. 10, lines 7-13);

removing an amount of the liquid from the storage device and adding solvent to the storage device in response to a measurement of the electrical characteristic of the liquid (p. 13, lines 11-16), the solvent added to the storage device thereby altering the electrical characteristic of the liquid in the storage device (p. 11, lines 15-17); and

using said measurement of the electrical characteristic of the liquid to drive a display device (LEDs 36 in Figure 1; p. 5, lines 5-9) that is able to visually indicate a plurality of different conditions of said liquid (p. 12, lines 3-14; Figures 1 and 3).

Independent Claim 17

17. A method comprising:

forming an object by curing a resin with a laser (p. 7, lines 12-16);

providing a storage device containing a liquid (liquid storage device 22; Figure 1; p. 7; lines 17-19), the liquid comprising solvent and solute (p. 8, lines 16-19), the liquid having a ratio of the solute to the solvent (p. 9, lines 21-22 through p. 10, lines 1-13);

removing an amount of material by submersing the object in the liquid in the storage device such that the amount of material becomes additional solute in the liquid and thereby increases the ratio of the solute to the solvent of the liquid (p. 10, lines 7-13), the increase of the ratio altering an electrical characteristic of the liquid (p. 11, lines 15-17), the liquid comprising Tripropylene Glycol Methyl Ether (p. 2, lines 1-3 and p. 8, lines 16-19);

utilizing changes in the electrical characteristic of the liquid as an indicator of the ratio of the solute to the solvent of the liquid (p. 11, lines 1-2 through p. 12, lines 1-14; Figure 3); and

using a plurality of display elements (LEDs 36; Figure 1; p. 5, lines 5-9) to visually indicate changes in said ratio.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL – UNDER 37 C.F.R. § 41.37(c)(1)(vi)

Appellant presents the following ground of rejection for review:

Rejection 1: Whether claims 1, 4, 6-7, 10, 13 and 16 are obvious under 35 U.S.C. §103 in view of Nakagawa et al. (U.S. Patent Pub. No. 2002/0197869), in view of Paal et al. (4,015,986), and further in view of Obeng (U.S. Patent No. 5,670,376).

Rejection 2: Whether claims 2, 5 and 11 are obvious under 35 U.S.C. §103 in view of Nakagawa et al., in view of Paal et al., in view of Obeng, and further in view of Oberlander et al. (U.S. Patent No. 6,368,421).

Rejection 3: Whether claims 8-9 and 14-15 are obvious under 35 U.S.C. §103 in view of Nakagawa et al., in view of Paal et al., in view of Obeng, and further in view of Kung (U.S. Patent Pub. No. 2004/0160225).

Rejection 4: Whether claim 17 is obvious under 35 U.S.C. §103 in view of Nakagawa et al., Paal et al., Oberlander et al., and further in view of Obeng.

ARGUMENT – UNDER 37 C.F.R. § 41.37(c)(1)(vii)

Pursuant to 37 C.F.R. § 41.37(c)(1)(vii), the following provides the contentions of Appellant with respect to each of the grounds of rejection enumerated above that are being presented for review in accordance with 37 C.F.R. § 41.37(c)(1)(vi).

Argument Regarding Rejection 1 under 35 U.S.C. §103

Independent claim 1 specifically recites *"using said changes in the electrical characteristic of the liquid to drive a visual display that is able to provide a plurality of different indications as to said ratio.* Independent claim 10 stands amended along similar lines as follows: "*using said changes in the electrical characteristic of the liquid to drive a visual display that is able to provide a plurality of different indications as to said ratio".*

Nakagawa et al. does not disclose or suggest any kind of display system for visually indicating the condition (or characteristics) of the liquid being used in the stripping system. In the Nakagawa et al. system, the users of the system would not be provided with any visual signal or indication as to the condition of the liquid, let alone whether the liquid was approaching a point at which it would need to be changed. This is because Nakagawa et al. allows an absorbtiometer 15 and an electrical conductivity meter 16 (Figure 1; paragraph 63) to feed signals to controllers 30 and 31, which in turn actuate control valves 24-27 (Figure 1; page 6, paragraph 71) that control the supply of fluids to a treatment bath 1. Thus, there would be **no need for a display system** in Nakagawa et al. to alert a user as to the changing ratio of various intermixed components making up the liquid, since the maintenance of the liquid in the fluid bath 1 is handled by the addition of various controllers and valves that resupply the treatment bath 1 as needed. Thus, there is absolutely no visual monitoring of the condition of the fluid required by an individual with the Nakagawa et al. system.

Paal et al. also does not disclose or suggest anything regarding using a display system to indicate the ratio of the dissolved resin to the solvent. Paal et al. merely involves the submersion of a substrate in a liquid contained within an open tank (col. 2, lines 60-65). There is no discussion or suggestion in Paal et al. of using a display system and a monitoring device that communicate so that the display device can indicate the condition of the solvent in the tank.

Obeng relates to a semiconductor manufacturing device for removing photoresist or post halogen etch cleanup, and is monitored by measuring the conductivity of a solvent used in the process. The Examiner has erroneously cited Obeng to show a "display" being used to visually display changes in the conductivity. Obeng does not show any such component, nor does it suggest the use of a display system that can display a plurality of different indications as to the ratio of the dissolved resin to the solvent. At best, Obeng discloses the use of a computer that may trigger an alarm when the solvent conductivity reaches a certain predetermined threshold (Column 3, lines 21-24). It is noteworthy that Obeng does not show or mention the use of any form of "display system", as this terminology is used in the method and system of the Applicant's disclosure and in the pending claims under review. The Abstract, cited by the Examiner as mentioning a "display", merely mentions "monitoring" the quality of solvents used in semiconductor manufacturing. There is no disclosure or even suggestion that this "monitoring" is accomplished through a "display".

In Obeng, column 3, lines 1-38, which the Examiner says discloses that "*changes in the conductivity . . . are measured, monitored and visually displayed via a*

computer", does not disclose displaying conductivity changes via a display. This section of text merely states that the computer **may signal alarm flags** if the conductivity reaches a certain point, and that the computer 23 "trips" an alarm when the conductivity of the solvent reaches an upper limit. Again, there is absolutely no mention that conductivity values are displayed on a display system for a user to see.

It is also noteworthy that Obeng makes absolutely no mention of using a display system to display conductivity values. This is further evidence that the combination of limitations recited in the above mentioned claims is new and non-obvious.

There is No Need for a Conductivity Display System In Nakagawa et al.

An important consideration in the Board's review of this matter should be the fact that there simply is no need for any display operation (or subsystem) in the Nakagawa et al. system. Since the control of the constituency of the intermixed liquid in Nakagawa et al. is controlled automatically by controllers 30 and 31, and valves 24-27, there would be absolutely no motivation for one skilled in this art to have thought to combine a display system to help provide a visual indication as to the ratio of the fluid in the bath 1 of Nakagawa et al. A visual display system would have provided no benefit, no practical added utility, and would have served no purpose, if incorporated into the Nakagawa et al. system.

Argument Regarding Rejection 2

Dependent claims 2, 5 and 11 depend ultimately from either independent claim 1 or independent claim 10. In view of the above arguments concerning independent claims 1 and 10, it is believed that this rejection is improper, and reversal is respectfully solicited.

Argument Regarding Rejection 3

Claims 8-9 and 14-15 depend ultimately from either independent claim 1 or independent claim 10. In view of the above arguments concerning these claims it is believed that this rejection is improper, and reversal is respectfully solicited. The Board should also take note that Kung involves a battery, light or fuse tester that makes use of a plurality of LEDs 80, 82 and 84 (see Figure 4; paragraph 34) to indicate the status of a battery, a light bulb or a fuse being tested (paragraph 34, lines 4-7). There is no discussion, let alone any suggestion, in Kung of using the LEDs in connection with a liquid monitoring operation where the LEDs provide an indication as to the changing chemical makeup of a fluid in a fluid reservoir. In fact, it is submitted that Kung, being essentially a portable, hand-held battery, fuse and light bulb tester, is fundamentally non-analogous art to the present application.

It is submitted that one of ordinary skill in the art of methods and systems involving fluid baths used in various manufacturing processes would not have been motivated to search out and review hand-held battery and fuse testers for ideas on how to visually indicate a chemical constituency of two or more liquids intermixed together in a fluid reservoir. Furthermore, it is submitted that one of ordinary skill in

this art, prior to the date of filing of the present application, who was simply viewing the Kung reference in connection with the Nakagawa et al. and Pall et al. references would not have been motivated to incorporate the LEDs disclosed in Kung into an operation (or system) to provide a visual indication as to the ratio of two intermixed liquids. For this reason reversal of the rejection of the claims is respectfully solicited.

Argument Regarding Rejection 4

It is submitted that independent method claim 17 was erroneously rejected as being obvious in view of Nakagawa et al., in view of Paal et al, in view of Oberlander et al, and further in view of Obeng. This rejection is respectfully traversed. The Board will note that claim 17 recites "using a plurality of display elements to visually indicate changes in said ratio." Again, Oberlander et al. does not disclose or suggest anything regarding possibly using a display system in connection with a liquid stripping system such as disclosed in Nakagawa et al. Obeng makes no mention that a display system is being used with its system. The limitation of "using a plurality of display elements (LEDs 36; Figure 1; p. 5, lines 5-9) to visually indicate changes in said ratio" is completely absent from the cited references, and certainly not suggested from this combination of references. Reversal of this rejection is therefore respectfully solicited.

The Examiner Has Not Made A Prima Facie Case of Obviousness

It is well established that the Examiner must present a prima facie case of obviousness, otherwise the Applicant is entitled to grant of a patent. If examination at the initial stage does not produce a prima facie case of unpatentability, then without

more the Applicant is entitled to grant of the patent. *In re Oetiker*, 977 F.2d 1443, 24 USPQ 2d 1443 (Fed. Cir. 1992). The establishment of a *prima facie* case of obviousness requires that three basic criteria be met:

1) that there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings;

2) that there must be a reasonable expectation of success; and

3) that the prior art reference or references must teach or suggest all the claim limitations.

See, e.g., In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Moreover, the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicants' disclosure. *Id.*

Furthermore, to imbue one of ordinary skill in the art with knowledge of the invention in suit, *when* no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher. In re Fine, 837 F.2d 1071, 1075, 5 USPQ2d 1596, 1600 (citing W.L. Gore & Assocs. v. Garlock, Inc., 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed. Cir. 1983)).

In this instance, it is respectfully submitted that the Examiner has not presented a prima facie case of obviousness. With regard to independent claims 1 and 10, the combination of the Nakagawa et., Paal et al. and Obeng references simply to do not

teach or suggest all of the limitations of the subject matter of these claims. Most particularly, the limitation of "***driving a display device***" is completely absent in the references cited by the Examiner.

With regard to claims 8-9 and 14-15, there is further no motivation or desirability apparent from the Nakagawa et al., Paal et al., Obeng and Kung references to combine the teachings of the Kung reference with those of the Nakagawa et al. system. Kung is related to a device (i.e., battery tester) that has nothing to do with monitoring the chemical makeup of a liquid bath. It is well established by the CAFC that there must be some teaching, motivation or desirability to combine the prior art references. None of these factors are present in this instance. A general relationship between fields of the prior art patents that are being combined is not sufficient to establish the "suggestion" or "motivation". See e.g., C.R. Bard, Inc. v. M3 Sys., Inc., 157 F.3d 1340, 1352 (Fed. Cir. 1998); Interactive Techs., Inc. v. Pittway Corp., Civ. App. No. 98-1464, slip op. at 13 (Fed. Cir. June 1, 1999) (unpublished), cert. denied, 528 U.S. 528 U.S. 1046 (1999).

Furthermore, the Federal Circuit has stated:

> *The genius of invention is often a combination of known elements which in hindsight seems preordained. To prevent hindsight invalidation of patent claims, the law requires some "teaching, suggestion or reason" to combine the cited references. . . . When the art in question is relatively simple, as is the case here, the opportunity to judge by hindsight is particularly tempting. Consequently, the tests of whether to combine references need to be applied rigorously.*

McGinley v. Franklin Sports Inc., 262 F.3d 1339, 60 USPQ2d 1001, 1008 (Fed. Cir. 2001) (citing Gambro Lundia AB v. Baxter Healthcare Corp., 110 F.3d 1573, 1579, 42 USPQ 2d 1378, 1383 (Fed. Cir. 1997).

In this example, with regard to claims 8-9 and 14-15, the Kung and Nakagawa et al. references would definitely not be two references that a skilled artisan would have been motivated to combine, if the artisan had no knowledge of the presently claimed invention. They do not involve creating the same, or even a similar, type of article, and the display LEDs in Kung would have no purpose in the Nakagawa et al. system, where the chemical makeup of the solvent is automatically controlled without user monitoring of the solvent. Accordingly, it is respectfully maintained that the combination of references applied by the Examiner has been made in hindsight using the pending claims as a road map, and that the rejection of claims 8-9 and 14-15 should therefore be reversed.

Conclusion

For the foregoing reasons, it is respectfully submitted that the rejection of all of the pending claims by the Examiner is improper under 35 U.S.C. §103. It is therefore respectfully requested that the various rejections be reversed and the application be passed to issue.

Respectfully submitted,

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CLAIMS APPENDIX

UNDER 37 C.F.R. § 41.37(c)(1)(viii)

1. (Previously Presented) A method comprising:

forming at least a portion of an object by curing resin;

providing a storage device containing a liquid, the liquid comprising solvent and dissolved resin, the liquid having a ratio of the dissolved resin to the solvent;

removing an amount of resin from the object by submersing the object in the liquid in the storage device in a manner such that the amount of resin becomes dissolved in the liquid and thereby increases the ratio of the dissolved resin to the solvent of the liquid, the increase of the ratio altering an electrical characteristic of the liquid;

utilizing changes in the electrical characteristic of the liquid as an indicator of the ratio of the dissolved resin to the solvent of the liquid; and

using said changes in the electrical characteristic of the liquid to drive a visual display that is able to provide a plurality of different indications as to said ratio.

2. (Previously Presented) The method in accordance with claim 1, wherein the curing of the resin in the step of forming at least the portion of the object occurs via a laser.

3. (Cancelled)

4. (Previously Presented) The method in accordance with claim 1, wherein the electrical characteristic is a conductivity of the liquid.

5. (Previously Presented) The method in accordance with claim 1, wherein the solvent recited in the steps is Tripropylene Glycol Methyl Ether.

6. (Previously Presented) The method in accordance with claim 1, wherein utilizing changes in the electrical characteristic of the liquid as an indicator of the ratio of the dissolved resin to the solvent of the liquid is performed to determine whether the ratio exceeds a desired range, and wherein the method further comprises removing at least some of the liquid from the storage device and adding solvent to the storage device after determining that the ratio exceeds the desired range.

7. (Previously Presented) The method in accordance with claim 6, wherein the electrical characteristic recited is a conductivity of the liquid.

8. (Previously Presented) The method in accordance with claim 1, wherein utilizing said changes in the electrical characteristic of the liquid to drive a display comprises visually indicating different ranges of the ratio via illumination and non-illumination of at least one light-emitting diode.

9. (Previously Presented) The method in accordance with claim 8, wherein utilizing changes in the electrical characteristic of the liquid as an indicator of the ratio of the dissolved resin to the solvent of the liquid comprises visually indicating at least three different ranges of the ratio via illumination and non-illumination of at least two light-emitting diodes.

10. (Previously Presented) A method comprising:

forming at least a portion of an object by curing resin;

providing a storage device containing a liquid, the liquid comprising solvent and dissolved resin, the liquid having at least one electrical characteristic;

removing an amount of resin from the object by submersing the object in the liquid in the storage device such that the amount of resin becomes dissolved in the liquid and thereby alters the electrical characteristic of the liquid;

removing an amount of the liquid from the storage device and adding solvent to the storage device in response to a measurement of the electrical characteristic of the liquid, the solvent added to the storage device thereby altering the electrical characteristic of the liquid in the storage device; and

using said measurement of the electrical characteristic of the liquid to drive a display device that is able to visually indicate a plurality of different conditions of said liquid.

11. (Previously Presented) The method in accordance with claim 10, wherein the curing of the resin forming at least the portion of the object occurs via a laser.

12. (Cancelled)

13. (Previously Presented) The method in accordance with claim 10, wherein the electrical characteristic in removing the amount of the liquid from the storage device and adding solvent to the storage device is a conductivity of the liquid.

14. (Previously Presented) The method in accordance with claim 10, wherein visually indicating a plurality of different conditions of said liquid comprises visually indicating different measurement ranges of the electrical characteristic via illumination and non-illumination of at least one light-emitting diode.

15. (Previously Presented) The method in accordance with claim 14, wherein visually indicating different measurement ranges comprises visually indicating at least three different measurement ranges via illumination and non-illumination of at least two light-emitting diodes.

16. (Previously Presented) The method in accordance with claim 14, wherein the electrical characteristic removing the amount of the liquid from the storage device and adding solvent to the storage device is a conductivity of the liquid.

17. (Previously Presented) A method comprising:

forming an object by curing a resin with a laser;

providing a storage device containing a liquid, the liquid comprising solvent and solute, the liquid having a ratio of the solute to the solvent;

removing an amount of material by submersing the object in the liquid in the storage device such that the amount of material becomes additional solute in the liquid and thereby increases the ratio of the solute to the solvent of the liquid, the increase of the ratio altering an electrical characteristic of the liquid, the liquid comprising Tripropylene Glycol Methyl Ether;

utilizing changes in the electrical characteristic of the liquid as an indicator of the ratio of the solute to the solvent of the liquid; and

using a plurality of display elements to visually indicate changes in said ratio.

18. (Withdrawn) An assembly comprising:

a storage device that is configured and adapted to store liquid;

an amount of liquid stored in the storage device, the liquid comprising solvent and dissolved resin; and

a monitoring device in communication with the liquid in the storage device, the monitoring device being adapted and configured to pass an electric current through at least some of the liquid and to produce a plurality of signals indicative of a plurality of conditions of conductivity of the liquid in the storage device.

19. (Withdrawn) An assembly in accordance with claim 18 wherein the monitoring device comprises at least one light-emitting diode, the light-emitting diode being configured to emit light in response to at least one of the signals produced by the monitoring device.

20. (Withdrawn) An assembly in accordance with claim 18 wherein the monitoring device is adapted and configured to produce a plurality of signals indicative of at least three conditions of conductivity of the liquid in the storage device.

21. (Withdrawn) An assembly in accordance with claim 20 wherein the monitoring device comprises at least two light-emitting diodes, the monitoring device be configured and adapted to selectively alter light emission from each of the two light-emitting diodes in a manner to display at least three separate visual identifiers, the monitoring device being further adapted and configured to display a different one of the visual identifiers in response to each of the plurality of signals indicative of the at least three conditions of conductivity of the liquid in the storage device.

Evidence Appendix

Under 37 C.F.R. §41.37 (c)(1)(ix)

None

RELATED PROCEEDINGS APPENDIX

Under 37 C.F.R. §41.37(c)(1)(x)

None.